General

Guideline Title

Final recommendation statement: statin use for the primary prevention of cardiovascular disease in adults: preventive medication.

Bibliographic Source(s)

Final recommendation statement: statin use for the primary prevention of cardiovascular disease in adults: preventive medication. [internet]. Rockville (MD): U.S. Preventive Services Task Force (USPSTF); 2016 Nov [11 p]. [45 references]

Guideline Status

This is the current release of the guideline.

This guideline updates a previous version: U.S. Preventive Services Task Force. Screening for lipid disorders in adults: U.S. Preventive Services Task Force recommendation statement. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2008 Jun. 13 p. [17 references]

This guideline meets NGC's 2013 (revised) inclusion criteria.

Recommendations

Major Recommendations

The U.S. Preventive Services Task Force (USPSTF) grades its recommendations (A, B, C, D, or I) and identifies the Levels of Certainty regarding Net Benefit (High, Moderate, and Low). The definitions of these grades can be found at the end of the "Major Recommendations" field.

Summary of Recommendation and Evidence

The USPSTF recommends that adults without a history of cardiovascular disease (CVD) (i.e., symptomatic coronary artery disease or ischemic stroke) use a low- to moderate-dose statin for the prevention of CVD events and mortality when all of the following criteria are met: (1) they are aged 40 to 75 years; (2) they have 1 or more CVD risk factors (i.e., dyslipidemia, diabetes, hypertension, or smoking); and (3) they have a calculated 10-year risk of a cardiovascular event of 10% or greater (B recommendation).

Identification of dyslipidemia and calculation of 10-year CVD event risk requires universal lipids screening in adults aged 40 to 75 years. See the "Clinical Considerations" section for more information on lipids screening and the assessment of cardiovascular risk.

Although statin use may be beneficial for the primary prevention of CVD events in some adults with a 10-year CVD event risk of less than 10%, the likelihood of benefit is smaller, because of a lower probability of disease and uncertainty in individual risk prediction. Clinicians may choose to offer a low- to moderate-dose statin to certain adults without a history of CVD when all of the following criteria are met: (1) they are aged 40 to 75 years; (2) they have 1 or more CVD risk factors (i.e., dyslipidemia, diabetes, hypertension, or smoking); and (3) they have a calculated 10-year risk of a cardiovascular event of 7.5% to 10% (C recommendation).

The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of initiating statin use for the primary prevention of CVD events and mortality in adults 76 years and older without a history of heart attack or stroke (I statement).

Patient Population Under Consideration

These recommendations apply to adults 40 years and older without a history of CVD who do not have current signs and symptoms of CVD (i.e., symptomatic coronary artery disease or ischemic stroke) (see Figure 2 in the original guideline document). Some individuals in this group may have undetected, asymptomatic atherosclerotic changes; for the purposes of this recommendation statement, the USPSTF considers these persons to be candidates for primary prevention interventions. These recommendations do not apply to adults with a low-density lipoprotein cholesterol (LDL-C) level greater than 190 mg/dL (to convert LDL-C values to mmol/L, multiply by 0.0259) or known familial hypercholesterolemia; these persons are considered to have very high cholesterol levels and may require statin use.

Clinical Considerations

Risk Factors for CVD

For the purposes of this recommendation, dyslipidemia is defined as an LDL-C level greater than 130 mg/dL or a high-density lipoprotein cholesterol (HDL-C) level less than 40 mg/dL (to convert HDL-C values to mmol/L, multiply by 0.0259). Most participants enrolled in trials of statin use for the prevention of CVD had an LDL-C level of 130 to 190 mg/dL or a diabetes diagnosis; hypertension and smoking were also common among trial participants. Persons with an LDL-C level greater than 190 mg/dL were usually excluded from trial participation, as it was not considered appropriate to randomly assign them to placebo. Thus, these recommendations do not pertain to persons with very high cholesterol levels (i.e., LDL-C >190 mg/dL) or familial hypercholesterolemia, as they were excluded from most prevention trials.

One trial, JUPITER (Justification for the Use of Statins in Prevention: An Intervention Trial Evaluating Rosuvastatin), which excluded persons with dyslipidemia or diabetes, evaluated the effect of high-dose rosuvastatin vs. placebo in participants with elevated C-reactive protein (CRP) levels. The USPSTF previously reviewed the evidence on the utility of CRP as a risk predictor of coronary heart disease and found that although there is an association between elevated CRP levels and coronary heart disease events, there is insufficient evidence that a reduction in CRP levels results in fewer CVD events. Additionally, CRP is not currently included in any of the major risk prediction calculators, and the effects of using CRP in addition to traditional CVD risk factors to guide the prescription of statins for reducing CVD risk are uncertain. As such, the USPSTF does not recommend for or against the use of CRP alone as a risk factor in screening to prevent CVD events in asymptomatic adults without a history of CVD. In JUPITER, most of the trial participants either also had hypertension (57%) or were smokers (15%)—risk factors the USPSTF prioritized for determining potential suitability for statin therapy. In the recent Heart Outcomes Prevention Evaluation 3 (HOPE-3) trial, there was no difference in the effects of statins among participants with or without elevated CRP levels.

10-Year Risk of CVD Events

The USPSTF recommends using the American College of Cardiology (ACC)/American Heart Association (AHA) Pooled Cohort Equations to calculate 10-year risk of CVD events. In 2013, the ACC/AHA released the Pooled Cohort Equations with the publication of new statin therapy guidelines. The calculator derived from these equations takes into account age, sex, race, cholesterol levels, systolic blood pressure level, antihypertension treatment, presence of diabetes, and smoking status as risk factors in the prediction model and focuses on hard clinical outcomes (heart attack and death from coronary heart disease; ischemic stroke and stroke-related death) as the outcomes of interest.

This risk calculator has been the source of some controversy, as several investigators not involved with its development have found that it overestimates risk when applied to more contemporary US cohorts, especially those at the lower end of the risk spectrum. Although other risk prediction tools are available, they address varying populations, risk factors, and outcomes and have their own limitations. The ACC/AHA risk calculator is, to date, the only US-based CVD risk prediction tool that has published external validation studies in other US-based populations. Other advantages are that it can generate sex- and race-specific risk predictions and that it includes ischemic stroke as an outcome.

Nonmodifiable risk factors for CVD include older age, male sex, and race/ethnicity; however, statin trials have not included persons with only these risk factors. Other risk factors, such as family history of premature coronary artery disease, have not been demonstrated to improve risk prediction in a clinically meaningful way.

It is important to note that the calculated 10-year CVD event risk derived from the ACC/AHA risk calculator is heavily influenced by age. For example, 41% of men and 27% of women aged 60 to 69 years without a history of CVD will be found to have a calculated 10-year CVD event risk of 10% or greater. Many older adults, particularly those aged 65 to 75 years, may meet the recommended risk threshold for treatment with statins in spite of the absence of dyslipidemia, diabetes, hypertension, or smoking. No trial data evaluated statin use among persons in this age group without CVD risk factors; thus, the evidence is insufficient to know whether statin use provides them the same or less benefit than in similarly aged adults with CVD risk factors. Decisions about initiating statin use in this age group should be based on shared decision making between

patients and clinicians about the potential benefits and harms. Specific recommendations from other organizations for such individuals are discussed in the "Recommendations of Others" section in the original guideline document.

Periodic assessment of cardiovascular risk factors from ages 40 to 75 years, including measurement of total cholesterol, LDL-C, and HDL-C levels, is required to implement this recommendation. The optimal intervals for cardiovascular risk assessment are uncertain. Based on other guidelines and expert opinion, reasonable options include annual assessment of blood pressure and smoking status and measurement of lipid levels every 5 years. Shorter intervals may be useful for persons whose risk levels are close to those warranting therapy, and longer intervals are appropriate for persons who are not at increased risk and have repeatedly normal levels.

Screening and Statin Use in Adults Aged 21 to 39 Years

The USPSTF systematically searched for evidence on the effect of screening for dyslipidemia in adults aged 21 to 39 years. It found insufficient evidence that screening for dyslipidemia before age 40 years has an effect on either short- or longer-term cardiovascular outcomes. The USPSTF found no studies that evaluated the effects of screening vs. no screening, treatment vs. no treatment, or delayed vs. earlier treatment in adults in this age group. Thus, the USPSTF recommends neither for nor against screening for dyslipidemia in this age group. A separate recommendation statement also found insufficient evidence to assess the balance of benefits and harms of screening for dyslipidemia in children and adolescents.

The USPSTF recognizes the rationale for screening for dyslipidemia in adults aged 20 to 39 years to identify those at risk for the development of early atherosclerosis, including those with familial hypercholesterolemia. Unfortunately, the evidence is lacking in this age group. The USPSTF found 4 trials of statin use for primary prevention that enrolled patients younger than 40 years. However, results were not reported separately for this age group, and it comprised a small part of the overall population. One cohort study compared the effects of statins vs. no statins for the treatment of familial hypercholesterolemia. However, the mean age of patients in this study was 44 years. Given the lack of data on the efficacy of screening for or treatment of dyslipidemia in adults aged 20 to 39 years, the USPSTF encourages clinicians to use their clinical judgment for patients in this age group.

Statin Use in Adults Aged 40 to 75 Years

Nineteen RCTs evaluated the effects of statins vs. placebo or no statins in adults aged 40 to 75 years without known CVD. Most of the trials, including the recently published HOPE-3 trial, enrolled participants based on an elevated LDL-C level, a diabetes diagnosis, or at least 1 CVD risk factor. Use of low- or moderate-dose statins was associated with a reduced risk of all-cause mortality (pooled risk ratio [RR], 0.86 [95% CI, 0.80-0.93]), cardiovascular mortality (RR, 0.69 [95% CI, 0.54-0.88]), ischemic stroke (RR, 0.71 [95% CI, 0.62- 0.82]), heart attack (RR, 0.64 [95% CI, 0.57-0.71]), and a composite cardiovascular outcome (RR, 0.70 [95% CI, 0.63-0.78]).

Among the study populations, the proportion of CVD events prevented (i.e., the relative risk reduction) was similar across age, sex, race/ethnicity, lipid level, and other risk factor categories. Among trials that stratified participants according to a baseline global cardiovascular risk score, similar relative risk estimates were observed among those classified at a higher vs. lower CVD event risk.

Given similar relative risk reductions, the absolute magnitude of benefit that an intervention with demonstrated efficacy can have in a specific population directly depends on the incidence of disease over time in that population. In other words, the more likely it is that persons in a certain population will have a heart attack or ischemic stroke, the greater the potential reduction in the number of CVD events with statin use will be in that population. This is one of the fundamental reasons for the distinction between a grade B and C recommendation for the population that presents with dyslipidemia, diabetes, hypertension, or smoking and a 10% or greater vs. 7.5% to 10% 10-year CVD event risk.

In the absence of other risk factors, adults with an LDL-C level greater than 190 mg/dL may still fall below the risk threshold for statin use for CVD prevention. As noted previously, these persons were generally excluded from the prevention trials evaluating the effects of statin use on health outcomes, because expert opinion strongly favors intervention for these individuals. It is possible that the relative risk reduction in this group is higher than in adults with a lower LDL-C level and that the absolute benefit is greater than would be predicted from a risk calculator.

Dosage

As previously noted, available RCTs evaluating statins for the prevention of CVD events largely used low and moderate doses. There were no clear differences in estimates of effect when the trials were stratified according to statin dose (see the table for the drug regimens used in the available trials in the original guideline document). The Cholesterol Treatment Trialists meta-analysis showed that greater degree of LDL-C reductions achieved were associated with proportional reductions in major cardiovascular events. However, these analyses were based not on randomized comparisons but on the degree of LDL-C reduction achieved. The degree of cholesterol reduction may be attributable, in part, to interindividual variability in response to statins, not just statin dosage.

Limited information is available about use of high-dose statins in a primary prevention population. As such, the harms of statin use for the prevention of CVD events in adults aged 40 to 75 years can only be bounded as small for low- or moderate-dose statins. There may be individual

clinical circumstances that warrant consideration of use of high-dose statins; decisions about dose should be based on shared decision making between patients and clinicians. However, the most directly applicable body of evidence for patients without a history of CVD demonstrates benefits with use of low- to moderate-dose statins.

Available information about use of high-dose statins in a prevention population comes from the JUPITER trial. The trial found an increased risk of physician-reported incident diabetes with statin use compared with placebo after 2 years of follow-up (3.2% vs 2.4%; RR, 1.25 [95% CI, 1.05-1.49]), which was not reported in trials evaluating use of moderate- or low-dose statins. Post hoc analysis subsequently suggested that many of the diabetes cases in JUPITER may have occurred in participants who had other risk factors for diabetes at baseline (e.g., impaired fasting blood glucose or obesity).

Summary

The incidence of CVD events in a population increases linearly with CVD risk level; there is no threshold at which event rates abruptly escalate. As such, any cut point for assessing where the net benefit of statin use shifts from small to moderate for a population requires judgment. Evidence indicates that currently available risk calculators tend to overestimate CVD risk, suggesting that actual benefits may be lower than estimated. Issues to consider include the uncertainty of current risk prediction methods, the overall probability of CVD events occurring in the population, the known and unknown associated harms of statin use, and patient preferences.

The USPSTF concludes that adults who smoke or have dyslipidemia, diabetes, or hypertension and a 10% or greater 10-year CVD event risk should be offered a low- to moderate-dose statin. Adults with diabetes or dyslipidemia and a 20% or greater 10-year CVD event risk are most likely to benefit from statin use.

Clinicians may selectively offer adults who smoke or have dyslipidemia, diabetes, or hypertension and a 7.5% to 10% 10-year CVD event risk a low- to moderate-dose statin. Fewer persons in this population will benefit from the intervention, so the decision to initiate use of low- to moderate-dose statins should reflect shared decision making that weighs the potential benefits and harms, the uncertainty about risk prediction, and individual patient preferences, including the acceptability of long-term use of daily medication.

Suggestions for Practice Regarding the I Statement for Initiating Statin Therapy for Primary Prevention in Adults 76 Years and Older

Potential Preventable Burden

Adults 76 years and older were not included in any of the randomized trials of statin use for the primary prevention of CVD. Thus, understanding of the potential benefits of initiating statin use for primary prevention in this age group is limited.

Potential Harms

Evidence on the potential harms of statin use for the primary prevention of CVD events in adults 76 years and older is very limited. Observational evidence suggests there may be an association between very low cholesterol levels and an increased risk of mortality with advanced age, after adjusting for other risk factors.

Current Practice

The most current data from the National Health and Nutrition Examination Survey indicate that nearly half (47.6%) of adults 75 years and older in the United States use prescription cholesterol-lowering medications. The majority (>80%) use a statin alone. The survey did not distinguish between the use of cholesterol-lowering medications for the purposes of primary vs. secondary prevention, so it is not possible to determine how many of these persons have had a previous heart attack or ischemic stroke. Another study using data from the Medical Expenditure Panel Survey, which did allow for the differentiation of individuals with and without vascular disease (defined as coronary heart disease, stroke, or peripheral vascular disease), found that the rate of statin use among adults 80 years and older for the purposes of primary prevention increased from about 9% in 1999-2000 to 34% in 2011-2012.

The Society for Post-Acute and Long-Term Care Medicine, as part of the Choosing Wisely campaign, highlighted the use of cholesterol-lowering medications in adults with limited life expectancy (i.e., 70 years and, most particularly, 85 years and older) among its "10 Things Physicians and Patients Should Question" because of the increased likelihood of an overall unfavorable risk-to-benefit ratio.

Other Approaches to Prevention

The USPSTF has made other recommendations relevant to the prevention of CVD in adults, including aspirin use for the prevention of CVD, screening for coronary heart disease using electrocardiography, use of nontraditional risk factors in CVD risk assessment, screening for high blood pressure, screening for abnormal blood glucose levels and type 2 diabetes mellitus, interventions for tobacco smoking cessation, behavioral counseling to promote a healthful diet and physical activity for CVD prevention in adults, and screening for and management of obesity in adults.

Definitions

What the United States Preventive Services Task Force (USPSTF) Grades Mean and Suggestions for Practice

Grade	Grade Definitions	Suggestions for Practice
A	The USPSTF recommends the service. There is high certainty that the net benefit is substantial.	Offer or provide this service.
B	The USPSTF recommends the service. There is high certainty that the net benefit is moderate or there is moderate certainty that the net benefit is moderate to substantial.	Offer or provide this service.
C	The USPSTF recommends selectively offering or providing this service to individual patients based on professional judgment and patient preferences. There is at least moderate certainty that the net benefit is small.	Offer or provide this service for selected patients depending on individual circumstances.
D	The USPSTF recommends against the service. There is moderate or high certainty that the service has no net benefit or that the harms outweigh the benefits.	Discourage the use of this service.
I Statement	The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of the service. Evidence is lacking, of poor quality or conflicting, and the balance of benefits and harms cannot be determined.	Read the "Clinical Considerations" section of the USPSTF Recommendation Statement (see the "Major Recommendations" field). If the service is offered, patients should understand the uncertainty about the balance of benefits and harms.

USPSTF Levels of Certainty Regarding Net Benefit

Definition: The U.S. Preventive Services Task Force defines certainty as "likelihood that the USPSTF assessment of the net benefit of a preventive service is correct." The net benefit is defined as benefit minus harm of the preventive service as implemented in a general, primary care population. The USPSTF assigns a certainty level based on the nature of the overall evidence available to assess the net benefit of a preventive service.

Level of Certainty	Description
High	The available evidence usually includes consistent results from well-designed, well-conducted studies in representative primary care populations. These studies assess the effects of the preventive service on health outcomes. This conclusion is therefore unlikely to be strongly affected by the results of future studies.
Moderate	The available evidence is sufficient to determine the effects of the preventive service on health outcomes, but confidence in the estimate is constrained by factors such as: • The number, size, or quality of individual studies • Inconsistency of findings across individual studies • Limited generalizability of findings to routine primary care practice • Lack of coherence in the chain of evidence As more information becomes available, the magnitude or direction of the observed effect could change, and this change may be large enough to alter the conclusion.
Low	The available evidence is insufficient to assess effects on health outcomes. Evidence is insufficient because of: • The limited number or size of studies • Important flaws in study design or methods • Inconsistency of findings across individual studies • Gaps in the chain of evidence • Findings not generalizable to routine primary care practice • A lack of information on important health outcomes More information may allow an estimation of effects on health outcomes.

Clinical Algorithm(s)

None provided

Scope

Disease/Condition(s)

- Lipid disorders
- Cardiovascular disease

Guideline Category

Prevention

Risk Assessment

Screening

Clinical Specialty

Cardiology

Family Practice

Internal Medicine

Preventive Medicine

Intended Users

Advanced Practice Nurses

Allied Health Personnel

Health Care Providers

Nurses

Physician Assistants

Physicians

Guideline Objective(s)

To update the 2008 U.S. Preventive Services Task Force (USPSTF) recommendation on screening for lipid disorders in adults

Target Population

Adults 40 years and older without a history of cardiovascular disease (CVD) who do not have current signs and symptoms of CVD (i.e., symptomatic coronary artery disease or ischemic stroke) (see Figure 2 in the original guideline document)

Note: Some individuals in this group may have undetected, asymptomatic atherosclerotic changes; for the purposes of this recommendation statement, the USPSTF considers these persons to be candidates for primary prevention interventions. These recommendations do not apply to adults with a low-density lipoprotein cholesterol (LDL-C) level greater than 190 mg/dL (to convert LDL-C values to mmol/L, multiply by 0.0259) or known familial hypercholesterolemia; these persons are considered to have very high cholesterol levels and may require statin use.

Interventions and Practices Considered

1. Screening for lipid disorders
2. Statins

Major Outcomes Considered

Screening for Dyslipidemia in Younger Adults

- Key Question 1: What are the benefits of screening for dyslipidemia in asymptomatic adults aged 21 to 39 years on heart disease (CHD)- or cerebrovascular accident (CVA, or stroke)–related morbidity or mortality, or on all-cause mortality?
- Key Question 2: What are the harms of screening for dyslipidemia in asymptomatic adults aged 21 to 39 years?
- Key Question 3: What is the diagnostic yield of alternative screening strategies (for example, universal vs. risk-based screening) for asymptomatic dyslipidemia in adults aged 21 to 39 years?
- Key Question 4: What are the benefits of dyslipidemia treatment (such as drug or lifestyle interventions) in adults aged 21 to 39 years on CHD- or CVA-related morbidity or mortality, or on all-cause mortality?
- Key Question 5: What are the benefits of delayed versus immediate dyslipidemia treatment in adults aged 21 to 39 years on CHD- or CVA-related morbidity or mortality, or on all-cause mortality?
- Key Question 6: What are the harms of drug treatment of asymptomatic dyslipidemia in adults aged 21 to 39 years?

Statins for Prevention of Cardiovascular Disease in Adults

- Key Question 1:
    a. What are the benefits of statins in reducing the incidence of CVD-related morbidity or mortality or all-cause mortality in asymptomatic adults 40 years and older without prior CVD events?
    b. What are the benefits of statin treatment to achieve target low-density lipoprotein cholesterol (LDL–C) levels vs other treatment strategies?
    c. Do the benefits vary in subgroups defined by demographic or clinical characteristics?
- Key Question 2: What are the harms of statin treatment?
- Key Question 3: How do benefits and harms vary according to statin treatment potency?

Methodology

Methods Used to Collect/Select the Evidence

Hand-searches of Published Literature (Primary Sources)

Hand-searches of Published Literature (Secondary Sources)

Searches of Electronic Databases

Description of Methods Used to Collect/Select the Evidence

Note from the National Guideline Clearinghouse (NGC): Two systematic evidence reviews were prepared by the Pacific Northwest Evidence-based Practice Center (EPC) for use by the U.S. Preventive Services Task Force (USPSTF) (see the "Availability of Companion Documents" field).

Screening for Dyslipidemia in Younger Adults

Data Sources and Searches

The reviewers searched the Cochrane Central Register of Controlled Trials and Cochrane Database of Systematic Reviews (through May 2016), Ovid MEDLINE (2008 through May 2016) (see Appendix Table 1 in the systematic review), and reference lists. Searches were limited to English-language articles. The reviewers also searched ClinicalTrials.gov for ongoing studies.

Study Selection

Two reviewers independently evaluated the literature on the basis of predefined criteria (see Appendix Table 2 in the systematic review). Eligible studies were randomized trials, cohort studies, and case–control studies of lipid screening versus no screening, dyslipidemia treatment versus no treatment, and delayed versus immediate dyslipidemia treatment in asymptomatic adults aged 21 to 39 years that evaluated mortality, cardiovascular outcomes (coronary heart disease [CHD]- or cerebrovascular accident [CVA]-related morbidity or mortality), or harms of screening or treatment. Studies reporting the diagnostic yield (number of true positives per number tested) of lipid screening in adults aged 21 to 39 years also were eligible for inclusion. Studies enrolling older adults were also eligible if the results were reported separately for patients younger than 40 years or if the mean age of the population was less than 40 years. Regarding treatment, both drug therapy and lifestyle interventions (such as exercise and diet changes) were eligible for inclusion.

Studies of individuals with prior cardiovascular events were excluded. The literature selection is summarized in Figure 2 in the systematic review.

Statins for Prevention of Cardiovascular Disease in Adults

Data Sources and Searches

A research librarian searched the Cochrane Central Register of Controlled Trials (from 1991), the Cochrane Database of Systematic Reviews (from 2005), and Ovid MEDLINE (from 1946) to June 2016 for English-language publications (see eAppendix 1 in the systematic review supplement), and reference lists. After the draft report was posted for public comment and peer review, the search was updated in June 2016 and 1 additional trial was added.

Study Selection

Two reviewers independently evaluated each study on the basis of predefined criteria at the abstract and full-text review levels (see eTable 1 in the systematic review supplement). The population of interest was adults 40 years and older without prior cardiovascular disease (CVD) events. Studies were limited to those in which fewer than 10% of the participants had prior CVD events to include only trials that predominantly enrolled the population of interest. The reviewers included randomized trials of statin therapy vs. placebo or no statin and assessed all-cause mortality, coronary heart disease, stroke-related morbidity or mortality, or harms of treatment (including muscle injury, cognitive loss, incident diabetes, and hepatic injury). They also included studies of statin treatment adjusted to achieve target low-density lipoprotein cholesterol (LDL-C) levels vs. fixed-dose or other treatment strategies and studies that evaluated effects of statin therapy intensity on benefits and harms. For diabetes incidence, large cohort and case-control studies of statin use vs. nonuse were also included. The selection of literature is summarized in Figure 2 in the systematic review (see the "Availability of Companion Documents" field).

Number of Source Documents

Screening for Dyslipidemia in Younger Adults

See the literature flow diagram (Figure 2) in the systematic review (see the "Availability of Companion Documents" field) for a summary of evidence search and selection.

Articles included for Key Questions:

- Key Question 1: 0 articles
- Key Question 2: 0 articles
- Key Question 3: 0 articles
- Key Question 4: 0 articles
- Key Question 5: 0 articles
- Key Question 6: 0 articles

Statins for Prevention of Cardiovascular Disease in Adults

See the literature flow diagram (Figure 2) in the systematic review (see the "Availability of Companion Documents" field) for a summary of evidence search and selection.

Articles included for Key Questions:

- Key Question 1a: 19 trials
- Key Question 1b: 0 trials

- Key Question 1c: 7 trials
- Key Question 2: 17 trials and 2 observational studies
- Key Question 3: 3 trials

Methods Used to Assess the Quality and Strength of the Evidence

Expert Consensus

Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence

Screening for Dyslipidemia in Younger Adults

The reviewers planned for 2 investigators to independently apply criteria developed by the U.S. Preventive Services Task Force (USPSTF) to rate the quality of each study as good, fair, or poor (see the systematic review appendix [see the "Availability of Companion Documents" field]), with discrepancies resolved through consensus. No studies, however, met the inclusion criteria.

Statins for Prevention of Cardiovascular Disease in Adults

Two investigators independently applied criteria developed by the USPSTF to rate the quality of each study as good, fair, or poor (see eTable2 in the systematic review supplement [see the "Availability of Companion Documents" field]). Discrepancies were resolved through consensus.

Methods Used to Analyze the Evidence

Meta-Analysis

Review of Published Meta-Analyses

Systematic Review with Evidence Tables

Description of the Methods Used to Analyze the Evidence

Note from the National Guideline Clearinghouse (NGC): Two systematic evidence reviews were prepared by the Pacific Northwest Evidence-based Practice Center (EPC) for use by the U.S. Preventive Services Task Force (USPSTF) (see the "Availability of Companion Documents" field).

Screening for Dyslipidemia in Younger Adults

Data Abstraction and Quality Rating

The investigators planned for 1 investigator to abstract details about each article's study design, patient population, setting, screening method, treatment regimen, analysis, follow-up, and results; 1 investigator to review the data abstraction for accuracy; and 2 investigators to independently apply criteria developed by the USPSTF to rate the quality of each study as good, fair, or poor (see the systematic review appendix), with discrepancies resolved through consensus. No studies, however, met the inclusion criteria.

Data Synthesis

The investigators planned to assess the aggregate internal validity (quality) of the body of evidence for each key question (good, fair, or poor) by using methods developed by the USPSTF, based on the number, quality, and size of studies; consistency of results among studies; and directness of evidence. No studies, however, met the inclusion criteria.

Statins for Prevention of Cardiovascular Disease in Adults

Data Abstraction and Quality Assessment

One investigator abstracted details about the study design, patient population, setting, screening method, interventions, analysis, and results, and a

second investigator checked the abstracted data. Two investigators independently applied criteria developed by the USPSTF to rate the quality of each study as good, fair, or poor (see eTable 2 in the systematic review supplement). Discrepancies were resolved through consensus.

Data Synthesis and Analysis

Meta-analyses were conducted to calculate risk ratios (RRs) for statins vs. placebo using the Dersimonian–Laird random-effects model with Review Manager version 5.2 (Cochrane Collaboration Nordic Cochrane Centre). Statistical heterogeneity was assessed with the I^2 statistic. When statistical heterogeneity was present (defined as I^2 >30%), sensitivity analysis was performed with the profile likelihood method using Stata version 10.1 (StataCorp). Additional sensitivity and stratified analyses were performed based on study quality, exclusion of trials that enrolled patients with prior cardiovascular disease (CVD) events, duration of follow-up, intensity of statin therapy, mean total cholesterol and low-density lipoprotein cholesterol (LDL-C) levels at baseline, and whether the trial was stopped early. For analyses with 10 or more trials, funnel plots were constructed to detect small sample effects.

The aggregate internal validity (quality) of the body of evidence was assessed for each key question using methods developed by the USPSTF (see eTable 3 in the systematic review supplement), based on the number, quality, and size of studies; consistency of results between studies; and directness of evidence.

Methods Used to Formulate the Recommendations

Balance Sheets

Expert Consensus

Description of Methods Used to Formulate the Recommendations

The U.S. Preventive Services Task Force (USPSTF) systematically reviews the evidence concerning both the benefits and harms of widespread implementation of a preventive service. It then assesses the certainty of the evidence and the magnitude of the benefits and harms. On the basis of this assessment, the USPSTF assigns a letter grade to each preventive service signifying its recommendation about provision of the service (see table below). An important, but often challenging, step is determining the balance between benefits and harms to estimate "net benefit" (that is, benefits minus harms).

U.S. Preventive Services Task Force Recommendation Grid*

Certainty of Net Benefit	Magnitude of Net Benefit			
	Substantial	Moderate	Small	Zero/Negative
High	A	B	C	D
Moderate	B	B	C	D
Low	Insufficient			

**A*, *B*, *C*, *D*, and *I (Insufficient)* represent the letter grades of recommendation or statement of insufficient evidence assigned by the USPSTF after assessing certainty and magnitude of net benefit of the service (see the "Rating Scheme for the Strength of the Recommendations" field).

The overarching question that the USPSTF seeks to answer for every preventive service is whether evidence suggests that provision of the service would improve health outcomes if implemented in a general primary care population. For screening topics, this standard could be met by a large randomized controlled trial (RCT) in a representative asymptomatic population with follow-up of all members of both the group "invited for screening" and the group "not invited for screening."

Direct RCT evidence about screening is often unavailable, so the USPSTF considers indirect evidence. To guide its selection of indirect evidence, the Task Force constructs a "chain of evidence" within an analytic framework. For each key question, the body of pertinent literature is critically appraised, focusing on the following 6 questions:

1. Do the studies have the appropriate research design to answer the key question(s)?
2. To what extent are the existing studies of high quality? (i.e., what is the internal validity?)
3. To what extent are the results of the studies generalizable to the general U.S. primary care population and situation? (i.e., what is the external validity?)

4. How many studies have been conducted that address the key question(s)? How large are the studies? (i.e., what is the precision of the evidence?)
5. How consistent are the results of the studies?
6. Are there additional factors that assist the USPSTF in drawing conclusions (e.g., presence or absence of dose-response effects, fit within a biologic model)?

The next step in the USPSTF process is to use the evidence from the key questions to assess whether there would be net benefit if the service were implemented. In 2001, the USPSTF published an article that documented its systematic processes of evidence evaluation and recommendation development. At that time, the USPSTF's overall assessment of evidence was described as good, fair, or poor. The USPSTF realized that this rating seemed to apply only to how well studies were conducted and did not fully capture all of the issues that go into an overall assessment of the evidence about net benefit. To avoid confusion, the USPSTF has changed its terminology. Whereas individual study quality will continue to be characterized as good, fair, or poor, the term *certainty* will now be used to describe the USPSTF's assessment of the overall body of evidence about net benefit of a preventive service and the likelihood that the assessment is correct. Certainty will be determined by considering all 6 questions listed above; the judgment about certainty will be described as high, moderate, or low.

In making its assessment of certainty about net benefit, the evaluation of the evidence from each key question plays a primary role. It is important to note that the USPSTF makes recommendations for real-world medical practice in the United States and must determine to what extent the evidence for each key question—even evidence from screening RCTs or treatment RCTs—can be applied to the general primary care population. Frequently, studies are conducted in highly selected populations under special conditions. The USPSTF must consider differences between the general primary care population and the populations studied in RCTs and make judgments about the likelihood of observing the same effect in actual practice.

It is also important to note that one of the key questions in the analytic framework refers to the potential harms of the preventive service. The USPSTF considers the evidence about the benefits and harms of preventive services separately and equally. Data about harms are often obtained from observational studies because harms observed in RCTs may not be representative of those found in usual practice and because some harms are not completely measured and reported in RCTs.

Putting the body of evidence for all key questions together as a chain, the USPSTF assesses the certainty of net benefit of a preventive service by asking the 6 major questions listed above. The USPSTF would rate a body of convincing evidence about the benefits of a service that, for example, derives from several RCTs of screening in which the estimate of benefits can be generalized to the general primary care population as "high" certainty (see the "Rating Scheme for the Strength of Recommendations" field). The USPSTF would rate a body of evidence that was not clearly applicable to general practice or has other defects in quality, research design, or consistency of studies as "moderate" certainty. Certainty is "low" when, for example, there are gaps in the evidence linking parts of the analytic framework, when evidence to determine the harms of treatment is unavailable, or when evidence about the benefits of treatment is insufficient. Table 4 in the methodology document listed below (see the "Availability of Companion Documents" field) summarizes the current terminology used by the USPSTF to describe the critical assessment of evidence at all 3 levels: individual studies, key questions, and overall certainty of net benefit of the preventive service.

Sawaya GF, Guirguis-Blake J, LeFevre M, Harris R, Petitti D; U.S. Preventive Services Task Force. Update on the methods of the U.S. Preventive Services Task Force: estimating certainty and magnitude of net benefit. Ann Intern Med. 2007;147:871-5. [5 references].

I Statements

For I statements, the USPSTF has a plan to commission its Evidence-based Practice Centers (EPCs) to collect information in 4 domains pertinent to clinical decisions about prevention and to report this information routinely. This plan is described in the paper: Petitti DB et al. Update on the methods of the U.S. Preventive Services Task Force: insufficient evidence. Ann Intern Med. 2009;150:199-205. www.annals.org

The first domain is potential preventable burden of suffering from the condition. When evidence is insufficient, provision of an intervention designed to prevent a serious condition (such as dementia) might be viewed more favorably than provision of a service designed to prevent a condition that does not cause as much suffering (such as rash). The USPSTF recognized that "burden of suffering" is subjective and involves judgment. In clinical settings, it should be informed by patient values and concerns.

The second domain is potential harm of the intervention. When evidence is insufficient, an intervention with a large potential for harm (such as major surgery) might be viewed less favorably than an intervention with a small potential for harm (such as advice to watch less television). The USPSTF again acknowledges the subjective nature and the difficulty of assessing potential harms: for example, how bad is a "mild" stroke?

The third domain is cost—not just monetary cost, but opportunity cost, in particular the amount of time a provider spends to provide the service, the amount of time the patient spends to partake of it, and the benefits that might derive from alternative uses of the time or money for patients,

clinicians, or systems. Consideration of clinician time is especially important for preventive services with only insufficient evidence because providing them could "crowd out" provision of preventive services with proven value, services for conditions that require immediate action, or services more desired by the patient. For example, a decision to routinely inspect the skin could take up the time available to discuss smoking cessation, or to address an acute problem or a minor injury that the patient considers important.

The fourth domain is current practice. This domain was chosen because it is important to clinicians for at least 2 reasons. Clinicians justifiably fear that not doing something that is done on a widespread basis in the community may lead to litigation. More important, addressing patient expectations is a crucial part of the clinician–patient relationship in terms of building trust and developing a collaborative therapeutic relationship. The consequences of not providing a service that is neither widely available nor widely used are less serious than not providing a service accepted by the medical profession and thus expected by patients. Furthermore, ingrained care practices are difficult to change, and efforts should preferentially be directed to changing those practices for which the evidence to support change is compelling.

Although the reviewers did not explicitly recognize it when these domains were chosen, the domains all involve consideration of the potential consequences—for patients, clinicians, and systems—of providing or not providing a service. Others writing about medical decision making in the face of uncertainty have suggested that the consequences of action or inaction should play a prominent role in decisions.

Rating Scheme for the Strength of the Recommendations

What the United States Preventive Services Task Force (USPSTF) Grades Mean and Suggestions for Practice

Grade	Grade Definitions	Suggestions for Practice
A	The USPSTF recommends the service. There is high certainty that the net benefit is substantial.	Offer or provide this service.
B	The USPSTF recommends the service. There is high certainty that the net benefit is moderate or there is moderate certainty that the net benefit is moderate to substantial.	Offer or provide this service.
C	The USPSTF recommends selectively offering or providing this service to individual patients based on professional judgment and patient preferences. There is at least moderate certainty that the net benefit is small.	Offer or provide this service for selected patients depending on individual circumstances.
D	The USPSTF recommends against the service. There is moderate or high certainty that the service has no net benefit or that the harms outweigh the benefits.	Discourage the use of this service.
I Statement	The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of the service. Evidence is lacking, of poor quality or conflicting, and the balance of benefits and harms cannot be determined.	Read the "Clinical Considerations" section of the USPSTF Recommendation Statement (see the "Major Recommendations" field). If the service is offered, patients should understand the uncertainty about the balance of benefits and harms.

USPSTF Levels of Certainty Regarding Net Benefit

Definition: The U.S. Preventive Services Task Force defines certainty as "likelihood that the USPSTF assessment of the net benefit of a preventive service is correct." The net benefit is defined as benefit minus harm of the preventive service as implemented in a general, primary care population. The USPSTF assigns a certainty level based on the nature of the overall evidence available to assess the net benefit of a preventive service.

Level of Certainty	Description
High	The available evidence usually includes consistent results from well-designed, well-conducted studies in representative primary care populations. These studies assess the effects of the preventive service on health outcomes. This conclusion is therefore unlikely to be strongly affected by the results of future studies.
Moderate	The available evidence is sufficient to determine the effects of the preventive service on health outcomes, but confidence in the estimate is constrained by factors such as: • The number, size, or quality of individual studies • Inconsistency of findings across individual studies

Level of Certainty	Description
	• Limited generalizability of findings to routine primary care practice • Lack of coherence in the chain of evidence
	As more information becomes available, the magnitude or direction of the observed effect could change, and this change may be large enough to alter the conclusion.
Low	The available evidence is insufficient to assess effects on health outcomes. Evidence is insufficient because of: • The limited number or size of studies • Important flaws in study design or methods • Inconsistency of findings across individual studies • Gaps in the chain of evidence • Findings not generalizable to routine primary care practice • A lack of information on important health outcomes More information may allow an estimation of effects on health outcomes.

Cost Analysis

The U.S. Preventive Services Task Force (USPSTF) does not consider the costs of providing a service in this assessment.

Method of Guideline Validation

Comparison with Guidelines from Other Groups

External Peer Review

Internal Peer Review

Description of Method of Guideline Validation

Peer Review

Before the U.S. Preventive Services Task Force (USPSTF) makes its final determinations about recommendations on a given preventive service, the Evidence-based Practice Center (EPC) and the Agency for Healthcare Research and Quality (AHRQ) send the draft evidence review to 4 to 6 external experts and to Federal agencies and professional and disease-based health organizations with interests in the topic. The experts are asked to examine the review critically for accuracy and completeness and to respond to a series of specific questions about the document. The draft evidence review is also posted on the USPSTF Web site for public comment. After assembling these external review comments and documenting the proposed response to key comments, the topic team presents this information to the USPSTF in memo form. In this way, the USPSTF can consider these external comments before it votes on its recommendations about the service. Draft recommendation statements are then circulated for comment among reviewers representing professional societies, voluntary organizations, and Federal agencies, as well as posted on the USPSTF Web site for public comment. These comments are discussed before the final recommendations are confirmed.

Response to Public Comment

A draft version of this recommendation statement was posted for public comment on the USPSTF Web site from December 22, 2015, to January 25, 2016. Some comments asked why the USPSTF recommended evaluation of cardiovascular disease (CVD) risk factors in addition to the use of a risk calculator or why it used different cut points compared with the American College of Cardiology (ACC)/American Heart Association (AHA) guidelines. In response, the USPSTF clarified its rationale, noting that trial participants generally had 1 or more CVD risk factors and were not recruited based on any particular calculated risk score or cut point. Reliance on a risk calculator such as the Pooled Cohort Equations alone as a basis for prevention may be problematic, given its possible overestimation of risk in some populations. As such, the USPSTF clarified that the benefits of statin use may be linear according to a patient's absolute risk level, and any cut points used are only population estimates of benefits. Clinicians should encourage individualized decision making regarding statin use in their patients, given the known potential benefits and harms.

A few comments requested clarification on the I statement regarding statin use among adults 76 years and older. The USPSTF clarified that the I statement pertains to initiating statin use for primary prevention in adults 76 years and older who are not already taking a statin. Some comments requested clarification regarding the optimal dose of statins. The USPSTF clarified that its recommendation for use of low- to moderate-dose statins is based on the fact that most of the trials were primarily of low to moderate doses, and there were no clear differences in estimates of

benefit when trials were stratified according to dose.

In addition, the USPSTF clarified that these recommendations do not pertain to adults with very high CVD risk, such as those with familial hypercholesterolemia or a low-density lipoprotein cholesterol (LDL-C) level greater than 190 mg/dL, since they were excluded from primary prevention trials. These persons should be screened and treated in accordance to clinical judgment for the treatment of dyslipidemia. Last, some comments inquired about the use of other factors for CVD risk assessment. The USPSTF clarified that C-reactive protein (CRP) level, coronary artery calcium score, ankle-brachial index, and other factors for CVD risk assessment are addressed in other USPSTF recommendations (available at https://www.uspreventiveservicestaskforce.org/).

Comparison with Guidelines from Other Groups

Recommendations for primary prevention from the following groups were discussed: the American College of Cardiology (ACC), the American Heart Association (AHA), the Mayo Clinic, the Canadian Cardiovascular Society, and the United Kingdom (UK) National Institute for Health Care Excellence.

Evidence Supporting the Recommendations

Type of Evidence Supporting the Recommendations

The type of evidence supporting the recommendations is not specifically stated.

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

Potential Benefits of Statin Use

The U.S. Preventive Services Task Force (USPSTF) found adequate evidence that use of low- to moderate-dose statins reduces the probability of cardiovascular disease (CVD) events (myocardial Infarction [MI] or ischemic stroke) and mortality by at least a moderate amount in adults aged 40 to 75 years who have 1 or more CVD risk factors (dyslipidemia, diabetes, hypertension, or smoking) and a calculated 10-year CVD event risk of 10% or greater.

The USPSTF found adequate evidence that use of low- to moderate-dose statins reduces the probability of CVD events and mortality by at least a small amount in adults aged 40 to 75 years who have 1 or more CVD risk factors (dyslipidemia, diabetes, hypertension, or smoking) and a calculated 10-year CVD event risk of 7.5% to 10%.

The USPSTF found inadequate evidence to conclude whether initiating statin use in adults 76 years and older who are not already taking a statin is beneficial in reducing the incidence of CVD events and mortality.

Potential Harms

Potential Harms of Statin Use

The U.S. Preventive Services Task Force (USPSTF) found adequate evidence that the harms of low- to moderate-dose statin use in adults aged 40 to 75 years are small. Randomized clinical trials (RCTs) of statin use for the primary prevention of cardiovascular disease (CVD) events have largely used low and moderate doses; under these conditions, statin use was not associated with serious adverse events such as cancer, severely elevated liver enzyme levels, or severe muscle-related harms. However, evidence concerning the association between statin use and diabetes mellitus is mixed, with 1 prevention trial suggesting that there may be a small increased risk of developing diabetes with use of high-dose statins. Myalgia is a commonly reported adverse effect of statins, but placebo-controlled trial data do not support the conclusion that statin use has a major causative role in its occurrence. Evidence for cognitive harms is relatively sparse; further research would be needed to more definitively establish the relationship between statin use and cognitive function. The USPSTF found no clear evidence of decreased cognitive function associated with statin use. These findings are consistent with those from a recent systematic review of RCTs and observational studies assessing the effect of statins on cognition that found no effect on incidence of Alzheimer disease or dementia. The recently published HOPE-3 (Heart

Outcomes Prevention Evaluation 3) trial found that statin use increased risk of cataract surgery, which was unanticipated and not a predetermined outcome of the trial. None of the other primary prevention trials reported this outcome.

The USPSTF found inadequate evidence on the harms of statin use for the prevention of CVD events in adults 76 years and older without a history of heart attack or stroke.

Qualifying Statements

Qualifying Statements

- The U.S. Preventive Services Task Force (USPSTF) makes recommendations about the effectiveness of specific clinical preventive services for patients without obvious related signs or symptoms.
- It bases its recommendations on the evidence of both the benefits and harms of the service and an assessment of the balance. The USPSTF does not consider the costs of providing a service in this assessment.
- The USPSTF recognizes that clinical decisions involve more considerations than evidence alone. Clinicians should understand the evidence but individualize decision making to the specific patient or situation. Similarly, the USPSTF notes that policy and coverage decisions involve considerations in addition to the evidence of clinical benefits and harms.
- Recommendations made by the USPSTF are independent of the U.S. government. They should not be construed as an official position of the Agency for Healthcare Research and Quality (AHRQ), the U.S. Department of Health and Human Services, or the National Institutes of Health.

Implementation of the Guideline

Description of Implementation Strategy

The experiences of the first and second U.S. Preventive Services Task Force (USPSTF), as well as that of other evidence-based guideline efforts, have highlighted the importance of identifying effective ways to implement clinical recommendations. Practice guidelines are relatively weak tools for changing clinical practice when used in isolation. To effect change, guidelines must be coupled with strategies to improve their acceptance and feasibility. Such strategies include enlisting the support of local opinion leaders, using reminder systems for clinicians and patients, adopting standing orders, and audit and feedback of information to clinicians about their compliance with recommended practice.

In the case of preventive services guidelines, implementation needs to go beyond traditional dissemination and promotion efforts to recognize the added patient and clinician barriers that affect preventive care. These include clinicians' ambivalence about whether preventive medicine is part of their job, the psychological and practical challenges that patients face in changing behaviors, lack of access to health care or of insurance coverage for preventive services for some patients, competing pressures within the context of shorter office visits, and the lack of organized systems in most practices to ensure the delivery of recommended preventive care.

Dissemination strategies have changed dramatically in this age of electronic information. While recognizing the continuing value of journals and other print formats for dissemination, the USPSTF will make all its products available through its Web site. The combination of electronic access and extensive material in the public domain should make it easier for a broad audience of users to access USPSTF materials and adapt them for their local needs. Online access to USPSTF products also opens up new possibilities for the appearance of the annual, pocket-size *Guide to Clinical Preventive Services*.

To be successful, approaches for implementing prevention have to be tailored to the local level and deal with the specific barriers at a given site, typically requiring the redesign of systems of care. Such a systems approach to prevention has had notable success in established staff-model health maintenance organizations, by addressing organization of care, emphasizing a philosophy of prevention, and altering the training and incentives for clinicians. Staff-model plans also benefit from integrated information systems that can track the use of needed services and generate automatic reminders aimed at patients and clinicians, some of the most consistently successful interventions. Information systems remain a major challenge for individual clinicians' offices, however, as well as for looser affiliations of practices in network-model managed care and independent practice associations, where data on patient visits, referrals, and test results are not always centralized.

Implementation Tools

Mobile Device Resources

Patient Resources

Pocket Guide/Reference Cards

Staff Training/Competency Material

For information about availability, see the *Availability of Companion Documents* and *Patient Resources* fields below.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Staying Healthy

IOM Domain

Effectiveness

Patient-centeredness

Identifying Information and Availability

Bibliographic Source(s)

Final recommendation statement: statin use for the primary prevention of cardiovascular disease in adults: preventive medication. [internet]. Rockville (MD): U.S. Preventive Services Task Force (USPSTF); 2016 Nov [11 p]. [45 references]

Adaptation

Not applicable: The guideline was not adapted from another source.

Date Released

2016 Nov

Guideline Developer(s)

U.S. Preventive Services Task Force - Independent Expert Panel

Guideline Developer Comment

The U.S. Preventive Services Task Force (USPSTF) is a federally-appointed panel of independent experts. Conclusions of the U.S. Preventive Services Task Force do not necessarily reflect policy of the U.S. Department of Health and Human Services (DHHS) or its agencies.

Source(s) of Funding

The U.S. Preventive Services Task Force (USPSTF) is an independent, voluntary body. The U.S. Congress mandates that the Agency for Healthcare Research and Quality (AHRQ) support the operations of the USPSTF.

Guideline Committee

U.S. Preventive Services Task Force (USPSTF)

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*Members of the USPSTF at the time this recommendation was finalized. For a list of current Task Force members, go to http://www.uspreventiveservicestaskforce.org/Page/Name/our-members.

**Dr. Gillman was not affiliated with the National Institutes of Health while he was a member of the USPSTF.

Financial Disclosures/Conflicts of Interest

The U.S. Preventive Services Task Force (USPSTF) has an explicit policy concerning conflict of interest. All members disclose at each meeting if they have a significant financial, professional/business, or intellectual conflict for each topic being discussed. USPSTF members with conflicts may be recused from discussing or voting on recommendations about the topic in question.

Conflict of Interest Disclosures

All authors have completed and submitted the International Committee of Medical Journal Editors (ICMJE) Form for Disclosure of Potential Conflicts of Interest. Dr. Bibbins-Domingo reported having consulted for the Institute for Clinical and Economic Review on the cost-effectiveness of a new class of lipid-lowering drugs. Dr. Epling reported serving on a technical expert panel for the protocol review of a study related to comparative effectiveness of lipid-modifying agents. Dr. Gillman reported receiving a grant from the National Institutes of Health and receiving royalties from Cambridge University Press and UpToDate. Dr. Pignone reported receiving royalties from UpToDate. No other authors reported disclosures. Authors followed the policy regarding conflicts of interest described at https://www.uspreventiveservicestaskforce.org/Page/Name/conflict-of-interest-disclosures. All members of the USPSTF receive travel reimbursement and an honorarium for participating in USPSTF meetings.

Guideline Status

This is the current release of the guideline.

This guideline updates a previous version: U.S. Preventive Services Task Force. Screening for lipid disorders in adults: U.S. Preventive Services Task Force recommendation statement. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2008 Jun. 13 p. [17 references]

This guideline meets NGC's 2013 (revised) inclusion criteria.

Guideline Availability

Available from the U.S. Preventive Services Task Force (USPSTF) Web site .

Availability of Companion Documents

The following are available:

Evidence Reviews:

- Chou R, Dana T, Blazina I, Daeges M, Bougatsos C, Jeanne TL. Screening for dyslipidemia in younger adults: a systematic review to update the 2008 U.S. Preventive Services Task Force recommendation. Evidence Synthesis No. 138. AHRQ Publication No. 15-14-05206-EF-1. Rockville (MD): Agency for Healthcare Research and Quality; 2016 Nov. 56 p.
- Chou R, Dana T, Blazina I, Daeges M, Bougatsos C, Jeanne TL. Screening for dyslipidemia in younger adults: a systematic review for the U.S. Preventive Services Task Force. Ann Intern Med. 2016 Oct 18;165(8):560-8.
- Chou R, Dana T, Blazina I, Daeges M, Bougatsos C, Grusing S, Jeanne TL. Statin use for the prevention of cardiovascular disease in adults: a systematic review for the U.S. Preventive Services Task Force. Evidence Synthesis No. 139. AHRQ Publication No. 14-05206-EF-2. Rockville (MD): Agency for Healthcare Research and Quality; 2016 Nov. 178 p.
- Chou R, Dana T, Blazina I, Daeges M, Jeanne TL. Statins for prevention of cardiovascular disease in adults: evidence report and systematic review for the U.S. Preventive Services Task Force. JAMA. 2016 Nov 15;316(19):2008-24.

Available from the U.S. Preventive Services Task Force (USPSTF) Web site .

Background Articles:

- Barton M et al. How to read the new recommendation statement: methods update from the U.S. Preventive Services Task Force. Ann Intern Med. 2007;147:123-7.
- Guirguis-Blake J et al. Current processes of the U.S. Preventive Services Task Force: refining evidence-based recommendation development. Ann Intern Med. 2007;147:117-22. [2 references]
- Sawaya GF et al., Update on the methods of the U.S. Preventive Services Task Force: estimating certainty and magnitude of net benefit. Ann Intern Med. 2007;147:871-5. [5 references].
- Petitti DB et al. Update on the methods of the U.S. Preventive Services Task Force: insufficient evidence. Ann Intern Med. 2009;150:199-205.

Available from USPSTF Web site .

The following are also available:

- Statin use for the primary prevention of cardiovascular disease in adults: clinical summary. Rockville (MD): Agency for Healthcare Research and Quality; 2016 Nov. 1 p. Available from the USPSTF Web site .

The Electronic Preventive Services Selector (ePSS) is an application designed to provide primary care clinicians and health care teams timely decision support regarding appropriate screening, counseling, and preventive services for their patients. It is based on the current, evidence-based recommendations of the USPSTF and can be searched by specific patient characteristics, such as age, sex, and selected behavioral risk factors.

Patient Resources

The following is available:

- Lipid disorders: screening and treatment. JAMA patient page. JAMA. 2016;316(19):2056.

Myhealthfinder is a tool that provides personalized recommendations for clinical preventive services specific to the user's age, gender, and pregnancy status. It features evidence-based recommendations from the USPSTF and is available at www.healthfinder.gov .

Please note: This patient information is intended to provide health professionals with information to share with their patients to help them better understand their health and their

diagnosed disorders. By providing access to this patient information, it is not the intention of NGC to provide specific medical advice for particular patients. Rather we urge patients and their representatives to review this material and then to consult with a licensed health professional for evaluation of treatment options suitable for them as well as for diagnosis and answers to their personal medical questions. This patient information has been derived and prepared from a guideline for health care professionals included on NGC by the authors or publishers of that original guideline. The patient information is not reviewed by NGC to establish whether or not it accurately reflects the original guideline's content.

NGC Status

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